DEPARTMENT OF ENVIRONMENTAL QUALITY
PERMITTING and COMPLIANCE DIVISION
MONTANA POLLUTANT DISCHARGE ELIMINATION SYSTEM (MPDES)

Fact Sheet/Statement of Basis

Permittee:	City of Three Forks
Permit No.:	MT0020401
Receiving Water:	Madison River
Facility Information:	
Name	Domestic Wastewater Treatment Facility
Location	T 2N, R 1E, SE ¼ Section 25 & NE ¼ Section 36, Gallatin County GPS coordinates: N 45° 53’ 19”, W 111° 32’ 13”
Facility Contact:	Randy Johnston, Water/Wastewater Manager P.O. Box 187 Three Forks, MT 59752 (406) 285-3408
Fee Information:	
Number of Outfalls	1 (for fee determination purposes)
Outfall – Type	001 – Minor POTW, faculative lagoon facility with seasonal discharge

I. Permit Status

This is a renewal Montana Pollutant Discharge Elimination System (MPDES) permit for the City of Three Forks domestic wastewater treatment facility. The previous permit was issued on July 1, 1997 and expired on March 1, 2002. The permittee submitted an MPDES permit application (Short Form 2A) and application fees to the Department of Environmental Quality (Department) on July 12, 2001. Pursuant to ARM 17.30.1313, the expired permit remains effective until the renewed permit is issued.

II. Facility Information

A. Facility Description

The permittee operates a five-cell facultative lagoon system, initially constructed in 1960 and upgraded in 1980. The Operation and Maintenance (O&M) Manual (TDH, 1982) states that the treatment plant consists of conventional waste stabilization followed by a rapid infiltration (RI) system. The system has two primary facultative cells (7.4 acre each), two RI cells (1.2 acre each), and one storage cell (14.1 acre). Design criteria for the existing facility are given in Table 1 and Figure 1 shows the flow and components of the system. The RI cells a percolate recovery subdrain system and an effluent pumping station designed to pump effluent and some regional ground water to the Madison River via Outfall 001 (TDH, 1982).

Table 1: Current Design Criteria Summary (TDH, 1982; Great West Engineering, 2006)

Facility Description: **Two-cell facultative system with a storage cell and two infiltration cells**	
Construction Date: 1960	Modification Date: 1982
Design Population: 2,390	Current Population: 1,728 (2000 census)
Design Flow, Average (mgd): 0.453	Design Flow, Maximum Day (mgd): unknown
Primary Cells: 2	Secondary Cells: 1 (storage lagoon or RI beds)
Number Aerated Cells: 0	Minimum Detention Time-System (days): 104 at design flow
Design BOD Removal (%): 85	Design BOD Load (lb/day): 450
Design SS Removal (%): unknown	Design SS Load (lb/day): 450
Influent Flow (mgd): unknown	Source: Great West Engineering, 2006 PER
Collection System Combined [ ] Separate [X]	Estimated I/I: 250 gpcd (high water); 200 gpcd (Aug-May)
SSO Events (Y/N): unknown	Bypass Events (Y/N): unknown
Disinfection (Y/N): N	Type: NA
Discharge Method: Controlled - seasonal	

A Preliminary Engineering Report (PER) prepared for the permittee in February 2006 chronicles the existing conditions of the wastewater treatment facility and identifies upgrade options. The original treatment lagoon was constructed in 1960, and after a lift station became inoperable in 1970, raw sewage was directly discharged to the Jefferson River (Great West Engineering, 2006). The MPDES permit effective January 19, 1982 contained a compliance schedule that required secondary treatment and discharge to the Madison River by November 15, 1982. The lift station and treatment lagoons were upgraded as required by the permit. Two new facultative lagoons were constructed and the existing lagoon was converted into a storage cell and two RI cells. The two facultative lagoons have a PVC liner with an earthen cover (Great West Engineering, 2006).

The O&M manual states that treated wastewater in the RI cells either recharges the ground water or is recovered through use of the under drain system and discharged into the Madison River. The PER states that, while an under drain system collects some treated effluent, most wastewater from the RI cells discharges to ground water (Great West Engineering, 2006). During an MPDES site visit in August 2008, the Department found that the permittee does not operate or maintain the large effluent pumps installed for use in the percolate recovery system.

The permittee consistently reports 30 gallons per minute (gpm; 43,200 gallons per day) discharge to the Madison River in its monthly Discharge Monitoring Reports (DMR; Table 2). Assuming the EPA estimated domestic usage of 100 gallons per day per capita (gpdc) and the 2000 census population data (Table 1), the effluent discharge rate should be approximately 173,000 gallons per day (gpd). The permittee has not provided the Department actual quantification or a percentage value for total effluent discharged to either the Madison River or to the ground water to the Department. Neither the 2001 renewal application nor the expired permit identifies ground water as receiving water. A quantifiable water-balance has not been submitted to the Department.

The RI cells are used during the summer months (approximately April-October). During the remaining months, water is routed to the storage pond. The storage pond was designed to hold and evaporate wastewater during the winter months. The storage cell does not have a surface water discharge structure and was not designed to discharge to ground water. The PER states that the storage cell was lined with a bentonite liner, but the integrity of the liner has been compromised by an established cattail community and operational drying/wetting cycles, and likely has a significant leakage component (Great West Engineering, 2006). Cattails have been allowed to proliferate in the storage cell, as documented in the PER and verified during a Department site visit (August 2008). The PER estimates that approximately half (34 of 64 million gallons annually) of the wastewater routed to the storage cell leaks to the local ground water.

The treatment system has reached a critical O&M juncture. The PER indicates that the facultative lagoons are not providing required detention times based on current Department standards; combined, the two facultative lagoon cells offer an estimated 26 days of treatment at the design flow. The O&M manual states the design detention time is 32 days. The 1980 design provided flexibility for parallel or series operation for the facultative cells; the PER reports that the stop plate has been removed so the facility is in permanent parallel operation. During the

August 2008 MPDES compliance inspection, the Department noted that a slide gate is available but its use would require time-intensive cleaning of scum and solids from the slide track in the influent structure. A telescoping valve was installed to allow flexibility in operating levels in the facultative cells; the PER reports that the valve is no longer functional. The O&M manual states that the RI cells are necessary for the system to meet the 85% BOD removal. The Department observed that the RI cells and effluent recovery system are not used as the O&M manual directs.

The permittee recognized the collection system had excessive inflow and infiltration (I/I) and, by June 2008, 21,000 linear feet of old, clay-tile collection pipe was slipped lined. The City reports that influent flows to the treatment facility have been reduced by 50% (August 2008 compliance inspection). The I/I reduction effort also removed abandoned service lines. The PER reported that influent flows to the wastewater facility were as high as 250 gpcd during June and July, and were 200 gpcd the remainder of the year. Reduced influent flow should increase hydraulic detention time in the facultative cells.

The majority of the City's influent is routed through a single lift station to the facility. The Ridgeview subdivision (25-30 homes) is gravity fed to the facility. The two influents mix at the influent vault located at the head-end of the wastewater treatment facility. At present, the permittee does not have influent flow metering capabilities.

The system is not equipped with effluent disinfection capabilities. The discharge structure is located on the west bank of the Madison River and flows from the outlet down the bank approximately 15 feet over rocks to the river. A primary flow measuring device has not been installed. At its present condition, a bucket and stop watch are necessary to obtain flows for self-monitoring requirements. Effluent quality samples are collected at the end of pipe, as treated wastewater drains down the bank into the Madison River.

Luzenac Talc Mill discharges its non-contact cooling water to the publicly owned treatment works (POTW). In a November 5, 2001 letter to the Department, Luzenac states that all wastewater generated at the plant is routed to the POTW. The wastewater is described as being domestic waste and non-contacting cooling water. Luzenac maintained its own discharges and MPDES permit until September 2002 when the Department terminated the permit. According to the federal pretreatment requirements, a POTW must have a pretreatment program if it has one or more significant industrial users contributing to its wastewater. A significant industrial user, among other conditions, is one who discharges process wastewater to a POTW. In the federal regulations at 40 CFR 403.3, process wastewater excludes domestic wastewater, non-contact cooling water, and boiler blowdown.

B. Effluent Characteristics

A summary of self-reported effluent quality from DMRs is given in Table 2. The Period of Record (POR) is April 2003 through May 2008.

The permittee reported effluent five-day biochemical oxygen demand (BOD_5) data that exceeded the 30-day monthly permit limit of 30 mg/L for two monitoring periods, September 2006 and July 2007. No explanation is on file from the permittee for the exceedances.

Table 2: DMR Effluent Characteristics [1] for POR April 2003 through May 2008

Parameter	Location	Units	Previous Permit Limit	Minimum Value	Maximum Value	Average Value	Number of Samples
Flow, Daily Average	Effluent	mgd	[2]	0.0432	0.0432	0.0432	32
Biochemical Oxygen Demand (BOD_5)	Influent	mg/L	[3]	---	---	---	---
	Effluent	mg/L	45/30 [4]	5	40	15.6	32
	Effluent	% removal	85 [3]	---	---	---	---
	Effluent	lb/day	68[5]	1.8	14.4	5.6	32
Total Suspended Solids (TSS)	Influent	mg/L	[3]	---	---	---	---
	Effluent	mg/L	135/100 [4]	<10	42	<16.1	32
	Effluent	% removal	85 [3]	---	---	---	---
	Effluent	lb/day	378 [5]	0	15.1	4.5	32
E. coli Bacteria	Effluent	CFU per 100 mL	[6]	---	---	---	---
pH (median value)	Effluent	s.u.	6.0-9.0	6.6	9.0		31
Temperature	Effluent	ºC	[6]	---	---	---	---
Total Residual Chlorine	Effluent	mg/L	[6]	---	---	---	---
Total Ammonia as N	Effluent	mg/L	[2]	1.1	11	6.4	32
Total Kjeldahl Nitrogen	Effluent	mg/L	[2]	0.5	15.9	11.2	32
Nitrate + Nitrite as N	Effluent	mg/L	[2]	0.01	1.12	0.18	32
Total Nitrogen [7]	Effluent	mg/L	[2]	5.8	15.9	11.6	32
		lb/day	67 [5]	1.2	5.7	4.1	32
Total Phosphorus as P	Effluent	mg/L	[2]	0.56	4.24	2.30	32
		lb/day	17 [5]	0.20	2.27	0.89	32
Dissolved Oxygen	Effluent	mg/L	[6]	---	---	---	---
Oil and Grease	Effluent	mg/L	[6]	---	---	---	---
Total Dissolved Solids	Effluent	mg/L	[6]	---	---	---	---

Footnotes:

(1) Conventional and Non-conventional Pollutants only, table does not include information on toxic pollutants.
(2) No effluent limit in previous permit, monitoring requirement only.
(3) Effluent limit but no monitoring required in previous permit.
(4) Weekly Average Value/Monthly Average Value.
(5) Nondegradation value, not permit load limit.
(6) No effluent limit or monitoring requirement in previous permit
(7) Calculated as the sum of Nitrate + Nitrite as N and Total Kjeldahl Nitrogen (TKN) concentrations.

C. Compliance History

Two MPDES compliance inspections were completed during the POR (June 24, 2004 and November 1, 2006). A pre-permitting site visit by MPDES personnel was completed on August 13, 2008). No permit violations were documented based on inspection or site visit findings for the POR.

During the 2004 inspection, the inspector noted after-market aeration windmills had been installed in the RI beds and were used to provide additional oxygenation to the wastewater. Cattail growth was documented in the facultative cells.

Conditions recorded from both the November 2006 inspection and the and August 2008 site visit were:

1. Horse grazing used to control vegetation grown on/along dikes within facility perimeter during summer;
2. Cattail growth in facultative lagoons;
3. Effluent flow not consistently measured for monthly self-monitoring reports; operator visually estimates flow and consistently reports same value on each Discharge Monitoring Report (DMR).

Following the November 2006 compliance inspection, the Department issued a letter that instructed the permittee to measure effluent discharge flow rate using a bucket and stop watch. The inspector reminded the permittee of how to report samples that were less than the detection limit.

Additional conditions observed during the August 2008 site visit were:

1. Windmills have been installed in the RI cells; at the time of the inspection, these windmills were inoperable. The windmills were not part of the original design based on the 1982 O&M manual;
2. The permittee does not operate and/or maintain the large ground water pumps that were installed to be used with the under-drain/effluent recovery system at the RI ponds;
3. Wastewater is added to the RI cells weekly; the RI cells are not allowed to completely dry, as required by the O&M manual, before additional wastewater is added;
4. Extensive cattail growth is present in the storage cell; and
5. Two monitoring wells have been completed at each monitoring well location; two wells are side-by-side (approximately 10 feet apart), yet only one well is used for required monitoring purposes.

The Department recommended that the permittee immediately begin accurately monitoring wastewater discharged to the Madison River. Also, the permittee was required to physically mark which monitoring wells were used for MPDES permit monitoring and requested completion information for the monitoring wells. Well logs for the monitoring wells were request by the Department.

III. Technology-Based Effluent Limits (TBELs)

Technology-based effluent limit (TBEL) regulations applicable to POTW are secondary treatment regulations, or equivalent, which are specified in 40 CFR 133. The Montana Board of Environmental Review adopted by reference 40 CFR 133 at ARM 17.30.1209. Secondary treatment is defined in terms of effluent quality as measured by BOD_5, Total Suspended Solids (TSS), percent removal of BOD_5 and TSS, and pH.

These requirements may be modified on a case-by-case basis for facilities that are eligible for treatment equivalent to secondary (TES) treatment (40 CFR 133.101(g)) or alternative state requirements (ASR) for TSS. To determine if a facility is eligible for TES the facility must meet the requirements of 40 CFR 133.101(g), summarized as follows:

1) The BOD_5 and TSS consistently achievable through proper operation and maintenance of the treatment works exceed the minimum effluent quality described for secondary treatment (40 CFR 122.102).
2) The treatment works utilize a trickling filter or waste stabilization pond, and
3) The treatment works utilizes biological treatment that consistently achieves a 30-day average of at least 65 percent removal (40 CFR 133.101(k)).

The previous permit applied NSS to the effluent BOD_5. The 85% percent removal requirement was included as a permit limit, but monitoring and reporting was not.

The previous permit allowed ASR for TSS in the effluent discharge and did not require monitoring or reporting of TSS percent removal. However, based on the information provided by the PER and the 2008 site visit observations, the facility does not meet the proper O&M requirement of 40 CFR 133 allowing for the application of TES. The effluent limit for TSS effluent limit is based on national secondary treatment standards, including 85% removal.

The existing compliance point, Outfall 001, is not representative of the volume and quality of the wastewater discharge from the facility for two reasons. For one-half of a typical year, the permittee routes wastewater to the storage cell. The quality is not monitored and the quantity of wastewater is unknown. Information presented to the Department indicates the storage cell leaks wastewater at rates greater than allowed by design. Secondly, the RI cells and percolate recovery subdrain system are not operated or maintained as designed. Based on self-monitoring data, approximately one-quarter of the effluent is quantified and monitored at Outfall 001.

When permit effluent limitations are impractical or infeasible at the point of discharge, ARM 17.30.1345(10) allows the Department to establish an internal compliance point. For the stated reasons, monitoring at existing Outfall 001 is not wholly representative of the volume and quality of effluent discharge. Effective upon issuance, the permittee will be required to monitor TBEL parameters at the splitter valve, designated as **Outfall 001A** (Figure 1).

Compliance with TBELs is at the last point of control, as required by federal regulation at 40 CFR 125.3(e) and adopted by reference at ARM 17.30.1344(2)(f). Dilution from ground water, surface water, or any other water outside of the wastewater treatment system can not be used to meet TBELs. As the facility is presently operated, the last point of control is at the splitter valve that routes wastewater into either the storage cell or the RI cells (Figure 1). Presently, the permittee cannot meet the TBELs at this location because the facultative cells offer less than 180 days of hydraulic detention time required for secondary treatment. A special condition is included in the MPDES permit with a compliance date for meeting TBELs at the splitter valve. Effective January 1, 2010, TBELs must be met at the last point of control.

Until January 1, 2010, the permittee is required to meet the TBELs listed in Table 3 at the discharge to the Madison River, **Outfall 001B**.

Mass-based limits are calculated as follows:

Load (lb/day) = Design Flow (mgd) x Concentration (mg/L) x Conversion Factor (8.34)

BOD:

30-d	Load = 0.453 mgd x 30 mg/L x 8.34	=	113 lb/day
7-d	Load = 0.453 mgd x 45 mg/L x 8.34	=	170 lb/day

TSS:

30-d	Load = 0.453 mgd x 30 mg/L x 8.34	=	113 lb/day
7-d	Load = 0.453 mgd x 45 mg/L x 8.34	=	170 lb/day

Table 3: Treatment Equivalent to Secondary Requirements[1]

Parameter	Units	Average Monthly Limit	Average Weekly Limit	Rationale
BOD_5	mg/L	30	45	40 CFR 133.102(a)
	lb/day	113	170	
	% removal	85 [2]		
TSS	mg/L	30	45	40 CFR 133.102(b)
	lb/day	113	170	
	% removal	85 [2]		
pH	s.u.	6.0-9.0 (instantaneous)		40 CFR 133.102 (c)

1. See Definitions section at end of permit for explanation of terms.
2. The arithmetic mean of the values for BOD_5 for effluent samples collected in a period of 30 consecutive days shall not exceed 15% of the arithmetic mean of the values for influent samples collected at approximately the same time during the same period (85% removal).

Nondegradation

The permit does not authorize a new or increased discharge, as defined in ARM 17.30.702(16), and therefore is not subject to the criteria in ARM 17.30.715(1).

Load allocations are given in Table 4. These allocations define baseline allocated loads for the facility. Any increase above this amount is subject to the provisions of Montana's Nondegradation Policy 75-5-303, MCA and ARM 17.30.705 *et seq*. The Department calculated nondegradation loads in the 1997 permit renewal based on the current facility for BOD_5, TSS, total nitrogen (TN) and total phosphorus as P (TP). For TSS, TN, and TP, the Department used the design flow (0.453 mgd). BOD_5 load allocation was calculated by applying 65% removal.

Table 4 gives the calculated nondegradation load and actual 30-day loads, as reported by the permittee.

Table 4: Calculated Allocated and Annual Actual Loads

Parameter	Allocated Load (lb/day)	Actual 30-day Average Loads (lb/day)				
		2003	2004	2005	2006	2007
BOD_5	68	6.3	4.0	5.5	5.5	7.7
TSS	378	9.2	5.6	5.8	3.9	4.6
Total Nitrogen	67.0	3.9	4.1	4.8	4.1	4.0
Total Phosphorus	17.1	0.7	0.8	1.0	1.0	0.7

IV. Water Quality-Based Effluent Limits (WQBELs)

Permits are required to include water quality-based effluent limits (WQBELs) when technology based effluent limits are not adequate to protect state water quality standards (40 CFR 122.44 and ARM 17.30.1344). ARM 17.30.637(2) states that no wastes may be discharged that can reasonably be expected to violate any state water quality standards. Montana water quality standards (ARM 17.30.601-670) define both water use classifications for all state waters and numeric and narrative standards that protect those designated uses. New sources, as defined in ARM 17.30.703(16), are subject to Montana Nondegradation Policy (75-5-303, MCA) and regulations (ARM 17.30.701-718).

A. Receiving Water

Surface Water

Wastewater is discharged from the facility to the Madison River**.** The receiving water is classified as B-1 according to Montana Water Use Classifications, ARM 17.30.610**.** Waters classified B-1 are to be maintained suitable for drinking, culinary, and food processing purposes after conventional treatment; bathing, swimming, and recreation; growth and propagation of salmonid fishes and associated aquatic life, waterfowl, and furbearers; and agricultural and industrial water supply.

The Madison River in the vicinity of the discharge is considered high quality water pursuant to Montana's Nondegradation Policy. Degradation of high quality water is not allowed unless authorized by the Department under 75-5-303(3), MCA.

The Madison River is located within the Madison River watershed as identified by the USGS; Hydrological Unit Code (HUC) is 10020007. The Montana stream segment identification number is MT41F001_010, defined as the reach from Ennis Dam to the mouth. This reach of the Madison River, in the vicinity of the discharge, is listed on the 1996 and 2006 303(d) lists. The 1996 303(d) list of impaired streams identified this reach of the Madison River as not supporting its drinking water use and partially supporting its fishery and aquatic life. Probable causes of impairments are from metals and thermal modifications.

The 2006 303(d) list listed this reach as not supporting cold water fishery and drinking water and partial use support for aquatic life. Agriculture, industrial, and contact recreation are fully supported. Probable causes of impairment are copper, lead, sedimentation/siltation, and temperature. Probable sources are identified as agriculture, dam construction, dam/impoundments, impacts from hydrostructure flow regulation/modification, impacts from abandoned mine lands, and natural sources. To date, a TMDL (Total Maximum Daily Load) has not been prepared or approved by the EPA for any of the listed causes.

Approximately five miles downstream of the discharge, the Madison River joins the Jefferson and Gallatin Rivers at the Missouri River headwaters. The upper reach of the Missouri River, defined as from its headwaters to Toston Dam (waterbody ID MT41I001_011), is listed as impaired on both the 1996 and 2006 303(d) list of impaired stream. The 1996 list identified nutrients as a cause of impairment, and the 2006 list identifies total nitrogen as a probable cause of impairment with municipal point sources identified as probable sources of impairment. This information is presented here because the upper reach of the Missouri River does not have any municipal point sources; wasteload allocations may be assigned to discharges on the Madison River in a Missouri River Total Maximum Daily Load (TMDL). Also on the 2006 303(d) impairment listing is arsenic, although it lists "natural sources" as the probable cause. To date, a TMDL has not been prepared or approved by the EPA for the listed causes on the Missouri River.

The USGS does not maintain a current flow gauging station on the Madison River near Three Forks. A discontinued station near Three Forks, station 06042500, has 12 years of record, from 1893-1896, 1928-1932, and 1941-1950. The USGS calculated seven-day 10-year flow (7Q10) is 570 cubic feet per second (cfs; McCarthy, 2004). Ennis Lake, a reservoir upstream of Three Forks, was constructed in 1901 by the Montana Power Company. No other large diversions, additions, or fluctuations are known of or believed present. The 7Q10 is representative of the current conditions. No other data are known.

Water quality data are limited for the Madison River near the point of discharge. Table 5 summarizes EPA STORET database information for flow, pH, temperature, hardness, nitrate plus nitrite as nitrogen (N), total ammonia as N, and total phosphorus. The data are dated (primarily 1970's) and were collected downstream of the current wastewater discharge location. The current facility was not discharging into the Madison River when the data were collected and the former facility reportedly discharged to the Jefferson River.

Table 5: Madison River near the City of Three Forks discharge [1]					
Parameter	Units	Number of Samples	Maximum	Minimum	Median
pH, seasonal – winter	s.u.	11	8.37	7.8	8.0
pH, seasonal – summer	s.u.	20	8.95	7.02	8.3
Temperature, seasonal – winter	°C	12	9.0	0.0	4.5
Temperature, seasonal – summer	°C	47	22.5	3.0	13.5
Total Hardness as $CaCO_3$	mg/L	19	105	66	90 [4]
Nitrate plus Nitrite as N	mg/L	22	0.11	0.01	0.1
Total Ammonia as N	mg/L	16	0.08	< 0.01	0.03
Total Kjeldahl Nitrogen	mg/L	3	0.33	0.19	0.21
Total N	mg/L	3	0.43	0.21	0.25
Total Phosphorus as P	mg/L	6	0.05	0.02	0.035

Footnote:
1. Data from EPA STORET database.

Ground Water

The permittee has collected ground water data from four monitoring wells installed around the perimeter of the wastewater treatment facility. A summary of the data is provided in Table 6.

The 2007 Geological Map of Montana (MBMG, 2007) shows the regional geology as Tertiary sediments or sedimentary rocks. Well logs from the Montana Ground Water Information Center (GWIC) indicate shallow area wells are completed in unconsolidated clay, sand, and gravel. No well logs were found for the wastewater facility monitoring wells.

The median specific conductivity (SC) of the four monitoring wells ranges from 1,435 to 2,000 μS/cm (Table 6). Based on these data, the local ground water is Class II ground water, which has SC greater than 1,000 μS/cm up to 2,500 μS/cm (ARM 17.30.1006). According to ARM 17.30.1006(2)(a), the quality of Class II ground water must be maintained so that these waters are suitable for the following beneficial uses: public and private water supplies, culinary and food processing, irrigation of some agricultural crops, drinking water for livestock and wildlife, and most commercial and industrial purposes. Human health standards listed in the Department Circular 7 (2006) apply to concentrations of dissolved substances in Class II ground waters, which have a specific conductance less than or equal to 2,500 μmhos/cm at 25 degrees Centigrade.

Table 6: Monitoring well data				
	Monitoring Well			
	M-1	M-2	M-3	M-4
Chloride (mg/L)				
Minimum	75	88	84	20
Maximum	190	152	115	183
Median	138	120	100	113
Nitrate plus nitrite (mg/L)				
Minimum	0.05	0.018	0.016	0.05
Maximum	1.0	1.0	1.0	1.0
Median	0.05	0.05	0.05	0.085
Total Ammonia as N (mg/L)				
Minimum	0.05	0.9	0.05	0.05
Maximum	4.5	2.9	2.84	1.0
Median	2.7	1.6	0.05	0.15
Specific Conductivity (µS/cm)				
Minimum	877	1,330	1,800	483
Maximum	2,210	2,190	2,580	1,960
Median	1,440	1,710	2,000	1,435

B. Mixing Zone

Surface Water

Pursuant to ARM 17.30.505(1)(c), discharge from Outfall 001 is considered to be an existing source for the purposes of establishing a mixing zone. The previous permit defined a surface water mixing zone as one-half mile downstream of the discharge and the entire width of the river. The downstream boundary was identified as "a point in the river just past a large island", located at the SW ¼ of Section 19, Township 2 North, Range 2 East. The defined mixing zone was based on best professional judgment. The previous permit did not identify specific constituents that required a mixing zone.

The Montana Water Quality Act requires that mixing zones be the smallest practicable size, have minimal effects on water uses, and have definable boundaries (MCA 75-5-301(4)). While the past permit defined boundaries, it did not provide information to satisfy the other two criteria. The permittee did not request or apply for a mixing zone.

A standard surface water mixing zone will be applied to Outfall 001 for total ammonia as N calculations. ARM 17.30.516(1) states that a standard mixing zone may apply if a discharge to surface water is small in comparison to the volume of the receiving water or if the mixing zone is nearly instantaneous and the parameter(s) of concern will not threaten or impair existing uses. The dilution ratio of the receiving water 7Q10 to the design discharge is 812. ARM 17.30.516(3)(a) states that discharge limitations will be based on dilution with the 7Q10 when a facility design flow is less than one million gallons per day and a dilution ratio greater than 100:1 exists.

The length of a standard mixing zone must not exceed more than one-half the mixing width calculation as given in ARM 17.30.516(4)(a) or extend downstream from the point of discharge more than ten stream widths at 7Q10, whichever is more restrictive. Actual channel data at or near the point of discharge are lacking. The stream width was estimated using aerial photos and is approximated as 100 feet at the point of discharge. Therefore, the mixing distance downstream is 1,000 feet.

A mixing zone for pathogens, as monitored by *Escherichia coli* (*E. coli)* bacteria, is not granted.

Ground Water

A ground water mixing zone has not been requested and is not granted.

C. Applicable Water Quality Standards

A discharge to surface water classified B-1 is subject to the specific water quality standards of ARM 17.30.623 (March 2006). In addition, the general provisions of ARM 17.30.635 through 637, 640, 641, 645 and 646 apply unless they conflict with ARM 17.30.623 (ARM 17.30.603(3)). ARM 17.30.623(2)(b) and (h) incorporate by reference Department Circular DEQ-7 "Montana Numeric Water Quality Standards" (February 2008).

ARM 17.30.637(2) states that no wastes may be discharged that can reasonably be expected to violate any standard. Pollutants typically present in domestic POTW effluent that may exceed water quality standards include Oil and Grease, *Escherichia coli* (*E. coli*) bacteria, low levels of dissolved oxygen (DO), total residual chlorine when used to control pathogens, and nutrients, including nitrate plus nitrite as nitrogen and/or total ammonia.

Total recoverable metals (arsenic, copper, and lead) are included in this section and in the water quality-based effluent limits discussion due to their inclusion on 303(d) lists of impaired streams.

Oil and Grease – ARM 17.30.637 (1) gives general prohibitions to municipal discharges. State surface waters must be free from substances attributable to municipal discharges that will create visible oil film, or be present at or excess of 10 mg/L.

***Escherichia coli* (*E. coli*) –** The standard for *E. coli* for the Madison River applies year-round. The standards applicable to the receiving surface water are:

1) April 1 through October 31, of each year, the geometric mean number of the microbial species *E. coli* must not exceed 126 colony forming units (cfu) per 100 milliliters (ml), nor are 10% of the total samples during any 30-day period to exceed 252 cfu per 100 ml (ARM 17.30.623(2)(a)(i)); and

2) November 1 through March 31, of each year, the mean number of *E. coli* organisms should not exceed 630 cfu per 100 ml and 10% of the samples during any 30-day period may not exceed 1,260 cfu per 100 ml (ARM 17.30.623(2)(a)).

Dissolved Oxygen – Freshwater aquatic life standards are characterized by the fishery (cold- or warm-water) and by the presence or absence of fish early life stages. Standards are further defined based on a time frame and required DO levels. The Madison River is classified B-1 (cold-water fishery) and all life stages are assumed to be present. DO standards for a B-1 waterbody are given in Table 7.

Table 7: B-1 Water Classification DO Standards

Dissolved Oxygen (mg/L)	30-Day Mean	7-Day Mean	7-Day Mean Minimum [3]	1-Day Minimum [3]
Early Life Stages [1, 2]	N/A	9.5	N/A	8.0
Other Life Stages	6.5	N/A	5.0	4.0

Footnotes:
N/A – "not applicable"
1 These are water column concentrations recommended to achieve the required inter-gravel dissolved oxygen concentrations.
2 Includes all embryonic and larval stages and all juvenile forms of fish to 30-days following hatching.
3 All minima should be considered as instantaneous concentrations to be achieved at all times.

Total Residual Chlorine – DEQ-7 lists the chronic and acute standards for total residual chlorine as 0.011 and 0.019 mg/L, respectively.

Nutrients – Total Nitrogen (TN) and Total Phosphorus (TP) are plant growth nutrients and are parameters of concern because the addition of nutrients from the mine may have an impact on the aquatic habitat and organism populations in the receiving water. ARM 17.30.637(1) states that State surface waters must be free from substances attributable to municipal, industrial, agricultural practices or other discharges that will create concentrations or combinations of materials which are toxic or harmful to human, animal, plant or aquatic life (ARM 17.30.637(1)(d)); and create conditions which produce undesirable aquatic life (ARM 17.30.637(1)(e)).

Total Ammonia as Nitrogen (N) – Ammonia nitrogen is not only a nutrient, but is characterized as a toxic parameter by DEQ-7 (February, 2008). ARM 17.30.623(2)(h) states that concentrations of toxic or harmful parameters which would remain in the water after conventional treatment may not exceed the applicable standards set forth in department Circular DEQ-7. Table 8 gives acute and chronic standards and ambient condition data used in the standards calculations.

Ammonia standards for surface water are pH and temperature dependant. The standards were calculated following the procedures outlined in the Department Circular WQB-7 (February 2008). Ammonia standards are further defined as acute one-hour average (CMC) and chronic 30-day average (CCC) criterion. The fishery present and associated life stages are also taken into consideration for ammonia standard calculations. The reach of the Madison River is a cold-water fishery, based on the water-use classification (B-1). Year-round early life stages are presumed present.

The EPA STORET database had ambient pH and water temperature data available for the Madison River. Using the pH and water temperature data, seasonal standards for the Madison River were calculated. The seasons used are summer, from April 1 through October 31, and winter, from November 1 though March 31. The acute limits, or CMC, were calculated using the 95th percentile for pH. The CCC was calculated using the 75th percentile for the pH and assumed water temperature. Total ammonia standard results are presented in Table 8.

Table 8: Ammonia standard calculations (DEQ, 2008).

Condition	Period [1]	Salmonids Present	Early Life Stages Present	Ambient Condition		Water Quality Standard [4]
				pH	Temperature °C	
Acute	Annual	Yes	NA	8.8 [2]	NA	1.23
Chronic	Winter	NA	Yes	8.2 [3]	6.6 [3]	1.79
Chronic	Summer	NA	Yes	8.5 [3]	18.3 [3]	0.85

Footnotes:
1. Winter is defined as November 1 through March 31; Summer as April 1 through October 31.
2. Based on 95th percentile of annual data.
3. Based on 75th percentile of values in the applicable period.
4. Based on Department Circular DEQ7 (February 2006)

Nitrate/Nitrite as Nitrogen (N) – The human health limit for nitrate/nitrite as N is 10 mg/L (DEQ-7, February 2008).

Metals – All references to specific metals are as "total recoverable". Surface water trace metal standards are given in Table 9.

Aquatic life water quality standards for copper and lead are based on the receiving water hardness reported as calcium carbonate ($CaCO_3$). The 25th percentile of the data set for the Madison River near the point of discharge was used for the metal standards calculations. Based on the data set, the 25th percentile was calculated as 77 mg/L $CaCO_3$.

Table 9: Surface water metal standards (DEQ, 2006)			
Parameter	Human Health Standard (mg/L)	Aquatic Life Standard	
		Acute (mg/L)	Chronic (mg/L)
Arsenic	0.010	0.340	0.150
Copper [1]	1.300	0.0109	0.0075
Lead [1]	0.015	0.0585	0.0023
Footnotes: 1. Aquatic Life standards are based on the 25th percentile receiving water hardness of 77 mg/L $CaCO_3$.			

D. Proposed WQBEL/WLA

Permits are required to include water quality-based effluent limits (WQBELs) when technology-based effluent limits are not adequate to protect water quality standards (40 CFR 122.44, ARM 17.30.1344). ARM 17.30.1345 requires WQBELs to be developed for any pollutant for which there is reasonable potential (RP) for discharges to cause or contribute to exceedances of instream numeric or narrative water quality standards. Analysis using EPA *Technical Support Document for Water Quality-based Toxics Control* (TSD; 1991) methods and qualitative examination of the data with respect to narrative standards has been conducted by the Department to determine reasonable potential for pollutants of concern (EPA, 1991).

RP is determined using Equation 1 and is based on estimated ambient water concentrations, maximum projected effluent concentrations, maximum reported flow of the wastewater treatment facility, and the applicable receiving water flow.

$$C_{RP} = \frac{C_E Q_E + C_S Q_S}{Q_E + Q_S} \qquad \text{(Equation 1)}$$

Where:

C_{RP} = receiving water concentration (RWC) after mixing, mg/L
C_E = maximum projected effluent concentration, mg/L
C_S = parameter concentration upstream of discharge, mg/L
Q_S = 7Q10 of receiving water flow, cfs
Q_E = maximum facility discharge rate, cfs

Parameters designated as WQBELs will be monitored at the discharge pipe to the Madison River. This location will be identified as **Outfall 001B.** Historically, this was the compliance and monitoring point for all parameters (TBELs and WQBELs).

Oil and Grease – The previous permit included an oil and grease narrative effluent requirement. The narrative plus the 10 m/L maximum limit will remain in the renewal permit. Quarterly monitoring for oil and grease will be required at Outfall 001B.

***Escherichia coli* (*E. coli*) Limits –** The facility does not have the capacity to disinfect. Discharging treated effluent through the RI cells may remove some pathogens through soil filtration.

The permittee did not collect pathogen data during the last permit cycle. Monthly effluent monitoring at Outfall 001b is required with this permit issuance. Final effluent limits must be met by January 1, 2010.

Dissolved Oxygen – Freshwater aquatic life standards are characterized by the fishery (cold- or warm-water) and by the presence or absence of fish early life stages. Standards are further defined based on a time frame and required DO levels. Classification states this waterbody is a cold-water fishery and all life stages are assumed to be present.

Secondary treatment standards are in effect and will protect the receiving water. Typically, facilities that provide significant removal of organic material, as measured by BOD_5, do not require effluent limits for DO.

Total Residual Chlorine – The present facility is not equipped for effluent disinfection prior to discharge. Should the permittee install chlorination for disinfection, the effluent total residual chlorine average monthly limit will be 0.011 mg/L and the maximum daily limitation will be 0.019 mg/L at the end of the discharge pipe into the Madison River (Outfall 001B). The effluent limit is the acute aquatic life standard and the limit meets the requirements of ARM 17.30.637(1), which states that discharges of pollutants cannot create concentrations that are toxic to aquatic life.

If ultraviolet disinfection (UV) is utilized, final limits for chlorine do not apply.

Total Nitrogen (TN) and Total Phosphorus (TP) – The Missouri River from its headwaters to Toston is 303(d) listed as impaired by total nitrogen (waterbody ID MT41I001_011). The outfall is located approximately five miles upstream of the Madison River confluence with the Missouri River headwaters. Municipal point sources are identified as probable sources of impairment to the Missouri River on the 2006 303(d) list.

TN and TP limits may be assigned to the wastewater discharge in future permits. At this point, however, key information is lacking for the facility and for effluent load limit derivation. Effluent TN and TP monitoring is required at Outfall 001B.

Total Ammonia as N – A projected maximum total ammonia concentration (C_E) was determined using the EPA TSD. The maximum reported total ammonia effluent concentration is 11.0 mg/L, based on self-monitoring data for the POR. A multiplier is used to project a maximum concentration that could be discharged from the facility based on self-reporting data and its variability. The TSD Table 3-2 provides statistically based multipliers for datasets at the 95% confidence interval. With an assumed dataset size of 20 (actual is 32 for POR) and CV of 0.3, the multiplier is 1.2. The projected maximum concentration is 13.2 mg/L (11 mg/L * 1.2).

The permittee has reported the same effluent discharge rate for each month of the POR - 30 gpm (0.0432 mgd). Based on the population of the community, the reported flow rate is low. For RP

analysis, a maximum rate should be used. The design flow rate, 0.453 mgd (0.701 cfs) was used because it is likely the facility's maximum discharge rate.

The ambient median receiving water total ammonia as N concentration is given in Table 5 (0.03 mg/L). The 7Q10 (570 cfs) was used.

Equation 1 RWC (C_{RP}) is 0.046 mg/L total ammonia as N, using the above stated values. This result is less than any standard given in Table 8. The effluent does not have RP to exceed water quality standards. An effluent limit does not apply. Effluent monitoring at Outfall 001B will be a permit requirement.

Nitrate plus Nitrite as nitrogen ($NO_{2/3}$) –Facultative lagoons may have effluent $NO_{2/3}$ levels that would require a mixing zone. The maximum $NO_{2/3}$ reported for the POR is 1.12 mg/L. Following the same steps outlined for total ammonia as N, the CV for $NO_{2/3}$ is 1.4, and at the 95^{th} percentile confidence interval in Table 3-2, the multiplier is 1.8. The projected maximum $NO_{2/3}$ concentration is 2.02 mg/L.

The resulting C_{rv} from Equation 1 is 0.102 mg/L. Based on the data used, RP does not exist for $NO_{2/3}$. An effluent limit does not apply. Effluent monitoring at Outfall 001b will be a permit requirement.

Metals – Effluent data have not been collected for total recoverable arsenic, copper, or lead. Because these are 303(d) listed causes of impairments to the Madison and Missouri Rivers, monitoring is required in both direct surface water discharge from Outfall 001B and in the ground water monitoring wells (as the dissolved fraction).

Whole Effluent Toxicity (WET) Limits - ARM 17.30.637(2)(d) prohibits discharges to state waters that would create concentrations or combinations of materials which are toxic or harmful to human, animal, plant or aquatic life. The Department may require WET testing based on criteria listed in ARM 17.30.1322(4)(j), which includes permittees with design flows greater than 1 mgd, POTWs with pretreatment programs, or other instances including variability of pollutants based on the treatment, dilution of the effluent in the receiving water, and/or receiving stream characteristics, including possible water quality impairment.

Beginning in calendar year 2012 through the effective date of the permit, WET monitoring of the effluent will be required. An assessment of toxicity in the effluent has not been performed at this facility. The permittee will be required to monitor potential toxicity in the effluent by means of acute WET testing (ARM 17.30.1322(6)(j)). Acute WET testing of the effluent at Outfall 001B shall be conducted semiannually on two species during the permit cycle as described in the permit. The Department follows the EPA Region VIII toxicity policy (EPA, August 1997).

V. Final Effluent Limits

Immediately upon permit issuance, TBEL effluent quality is applicable at Outfall 001B (the end of the discharge pipe to the Madison River). Effective January 1, 2011, the effluent quality at the last point of control must meet the TBEL effluent quality.

a. Outfall 001A

Final Limits – Effective January 1, 2011, the quality of the effluent at Outfall 001A shall meet the following limits.

Final Effluent Limitations: Outfall 001A

Parameter	Units	Average Monthly Limit [1]	Average Weekly Limit [1]	Maximum Daily Limit [1]
Biological Oxygen Demand (BOD_5)	mg/L	30	45	--
	lb/day	113	170	--
Total Suspended Solids (TSS)	mg/L	30	45	--
	lb/day	113	170	--

Footnotes:
1. See Definition section at end of permit for explanation of terms.

Effluent pH shall remain between 6.0 and 9.0 unless a variation is due to natural biological processes. For compliance purposes, any single analysis and/or measurement beyond this limitation shall be considered a violation of the conditions of this permit.

85 Percent (%) Removal Requirement for BOD_5:
The arithmetic mean of the BOD_5 for effluent samples collected in a period of 30 consecutive days shall not exceed 15% of the arithmetic mean of the values for influent samples collected at approximately the same times during the same period (85% removal). This is in addition to the concentration limitations on BOD_5.

85 Percent (%) Removal Requirement for TSS:
The arithmetic mean of the TSS for effluent samples collected in a period of 30 consecutive days shall not exceed 15% of the arithmetic mean of the values for influent samples collected at approximately the same times during the same period (85% removal). This is in addition to the concentration limitations on TSS.

b. Outfall 001B

Interim Limits – Effective upon issuance through December 31, 2010, the quality of the effluent at Outfall 001B shall meet the following limits.

Interim Effluent Limitations: Outfall 001B				
Parameter	Units	Average Monthly Limit [1]	Average Weekly Limit [1]	Maximum Daily Limit [1]
Biological Oxygen Demand (BOD_5)	mg/L	30	45	--
	lb/day	113	170	--
Total Suspended Solids (TSS)	mg/L	30	45	--
	lb/day	113	170	--

Footnotes:
1. See Definition section at end of permit for explanation of terms.

85 Percent (%) Removal Requirement for BOD_5 and TSS: The arithmetic mean of the BOD_5 and TSS for effluent samples collected in a period of 30 consecutive days shall not exceed 15% of the arithmetic mean of the values for influent samples collected at approximately the same times during the same period (85% removal). This is in addition to the concentration-based limitations.

Final Limits - effective January 1, 2011 through the effective date of the permit, effluent quality at Outfall 001B must meet the following limits.

Final Effluent Limitations: Outfall 001B				
Parameter	Units	Average Monthly Limit [1]	Average Weekly Limit [1]	Maximum Daily Limit [1]
E. coli bacteria [2, 4]	CFU/100ml	126	252	--
E. coli bacteria [3, 4]	CFU/100ml	630	1,260	--
Total Residual Chlorine (TRC)	mg/L	0.011	--	0.019

Footnotes:
1. See Definition section at end of permit for explanation of terms.
2. This limitation applies from April 1 through October 31.
3. This limitation applies from November 1 through March 31.
4. Report Geometric Mean if more than one sample is collected in the reporting period.

VI. Monitoring Requirements

A. Outfall 001A

Wastewater quality monitoring is required following the facultative lagoons (Figure 1). Samples must be collected and analyzed for BOD_5, TSS, temperature, and pH. This monitoring is in addition to monitoring at Outfall 001B.

Effective upon issuance, the permittee must monitor the volume and quality of the wastewater at Outfall 001A for the following parameters.

Outfall 001A Final Self-Monitoring Requirements

Parameter	Unit	Sample Location	Sample Frequency	Sample Type [1]
Flow	mgd	Splitter Valve	Continuous	Instantaneous [2]
5-Day Biological Oxygen	mg/L	Splitter Valve	1/Month	Composite
Total Suspended Solids	mg/L	Splitter Valve	1/Month	Composite
pH	s.u.	Splitter Valve	1/Month	Instantaneous
Temperature	°C	Splitter Valve	1/Month	Instantaneous

Footnotes:
1. See Definition section at end of permit for explanation of terms.
2. Requires recording device or totalizer; permittee shall report daily maximum and daily average flow on DMR.

B. Influent Monitoring

Influent monitoring samples will be collected at the influent manhole, located at the head-end of the wastewater treatment facility, and before wastewater is directed into the facultative lagoons. The influent sample must be a flow-weighted mixture from both influent contributors – the lift station and the Ridgeview subdivision.

Monitoring Requirements – Influent

Parameter	Unit	Sample Location	Sample Frequency	Sample Type [1]
Flow	mgd	Influent	Continuous	Instantaneous [2]
5-Day Biological Oxygen Demand (BOD_5)	mg/L	Influent	1/Month	Composite
Total Suspended Solids (TSS)	mg/L	Influent	1/Month	Composite

1. See Definition section at end of permit for explanation of terms.
2. Requires recording device or totalizer; permittee shall report daily maximum and daily average flow on DMR.

C. Outfall 001B

Monitoring Requirements – Outfall 001B					
Parameter	Unit	Sample Location	Sample Frequency	Sample Type [1]	RRV [2]
Flow	mgd	Effluent	Continuous	Instantaneous [7]	---
5-Day Biological Oxygen Demand (BOD_5)	mg/L	Effluent	1/Week	Composite	---
	% Removal [3]	Effluent	1/Month	Calculated	---
	lb/day	Effluent	1/Month	Calculated	---
Total Suspended Solids (TSS)	mg/L	Effluent	1/Week	Composite	10
	% Removal [3]	Effluent	1/Month	Calculated	---
	lb/day	Effluent	1/Month	Calculated	---
pH	s.u.	Effluent	1/Month	Instantaneous	0.1
Temperature	°C	Effluent	1/Month	Instantaneous	---
E. coli Bacteria	CFU/100ml	Effluent	1/Month	Grab	1/100 mL
Oil and Grease [4]	mg/L	Effluent	1/Quarter	Composite	1
Total Ammonia, as N	mg/L	Effluent	1/Week	Composite	0.05
Nitrate + Nitrite, as N	mg/L	Effluent	1/Week	Composite	0.01
Total Kjeldahl Nitrogen	mg/L	Effluent	1/Week	Composite	---
Total Nitrogen [5]	mg/L	Effluent	1/Week	Calculated	---
	lb/day	Effluent	1/Month	Calculated	---
Total Phosphorus, as P	mg/L	Effluent	1/Quarter	Composite	0.001
	lb/day	Effluent	1/Quarter	Calculated	---
Total Dissolved Solids (TDS)	mg/L	Effluent	1/Quarter	Composite	10
Dissolved Oxygen (DO)	mg/L	Effluent	1/Quarter	Instantaneous	0.05
Arsenic, total recoverable	mg/L	Effluent	Semi-Annual [6]	Composite	0.001
Copper, total recoverable	mg/L	Effluent	Semi-Annual [6]	Composite	0.001
Lead, total recoverable	mg/L	Effluent	Semi-Annual [6]	Composite	0.0005
Whole Effluent Toxicity, Acute [8]	% Effluent	Effluent	2/Year	Composite	---

Footnotes:

1. See Definition section at end of permit for explanation of terms.
2. The Required Reporting Value (RRV) is the detection level that must be achieved in reporting surface water or ground water monitoring or compliance data to the Department. The RRV is the Department's best determination of a level of analysis that can be achieved by the majority of the commercial, university, or governmental laboratories using EPA approved methods or methods approved by the Department.
3. See narrative discussion in this section of permit for additional details.
4. Use EPA Method 1664, Revision A: N-Hexane Extractable Material (HEM).
5. Calculated as the sum of Nitrate + Nitrite (as N) and Total Kjeldahl Nitrogen (as N) concentrations.
6. Collected during second calendar quarter (April through June) and third calendar quarter (July through September). A 30-day minimum time-span between sampling must be maintained.
7. Requires recording device or totalizer; permittee shall report daily maximum and daily average flow on DMR.
8. Effective calendar year 2012 through the effective date of the permit. See narrative discussion in Part IV.E.4 of permit for additional details.

The following parameters require effluent monitoring to be completed during calendar years 2009 and 2010 only. The list of parameters is required to complete the renewal application. The monitoring location for Outfall 001B is at the pipe into the Madison River (Figure 1).

Monitoring Requirements (Continued)

Parameter	Unit	Sample Frequency [8]	Sample Type [1]	RRV [2]
Antimony, Total Recoverable[3]	mg/L	Semi-Annual	Composite	0.003
Beryllium, Total Recoverable[3]	mg/L	Semi-Annual	Composite	0.001
Cadmium, Total Recoverable[3]	mg/L	Semi-Annual	Composite	0.00008
Chromium, Total Recoverable[3]	mg/L	Semi-Annual	Composite	0.001
Mercury, Total Recoverable[3]	mg/L	Semi-Annual	Composite	0.00001
Nickel, Total Recoverable[3]	mg/L	Semi-Annual	Composite	0.010
Selenium, Total Recoverable[3]	mg/L	Semi-Annual	Composite	0.001
Silver, Total Recoverable[3]	mg/L	Semi-Annual	Composite	0.0005
Thallium, Total Recoverable[3]	mg/L	Semi-Annual	Composite	0.0002
Zinc, Total Recoverable[3]	mg/L	Semi-Annual	Composite	0.010
Cyanide, Total	mg/L	Semi-Annual	Grab	0.005
Phenols, Total	mg/L	Semi-Annual	Grab	0.010
Hardness, Total (as $CaCO_3$)	mg/L	Semi-Annual	Grab	0.010
Volatile Organic Pollutants [4]	mg/L	Semi-Annual [6]	Composite	[7]
Semi-Volatile, Acid Compounds [5]	mg/L	Semi-Annual [6]	Composite	[7]
Semi-Volatile, Base Neutral [5]	mg/L	Semi-Annual [6]	Composite	[7]

Footnotes:

1. See Definition section at end of permit for explanation of terms.
2. The Required Reporting Value (RRV) is the detection level that must be achieved in reporting surface water or ground water monitoring or compliance data to the Department. The RRV is the Department's best determination of a level of analysis that can be achieved by the majority of the commercial, university, or governmental laboratories using EPA approved methods or methods approved by the Department.
3. Metals shall be analyzed as total recoverable, use EPA Method (Section) 4.1.4 [EPA 600/4-79-020, March 1983] or equivalent.
4. 40 CFR 122, Appendix J, Table 2, use EPA Method 624 or equivalent.
5. 40 CFR 122, Appendix J, Table 2, use EPA Method 625 or equivalent.
6. Sampling required only in second and third calendar years after the effective date of the permit. This information will not be entered on the DMR form; a copy of the analytical laboratory report must be attached to the DMR for the applicable reporting period.
7. See approved method for minimum level (ML).
8. A 30-day minimum time-span between sampling must be maintained.

D. Other Monitoring – Ground water

Monitoring wells, MW-1, -2, -3, and -4 are existing. Samples will be collected from these wells and monitored for the following parameters.

Monitoring Requirements – MW-1, -2, -3, -4				
Parameter	Unit	Sample Frequency	Sample Type[1]	RRV
Water temperature	° C	1/Quarter	Instantaneous	--
pH	s.u.	1/Quarter	Instantaneous	0.1
Specific Conductivity	µS/cm	1/Quarter	Instantaneous	--
Chloride	mg/L	1/Quarter	Grab	--
Total Ammonia as N	mg/L	1/Quarter	Grab	0.05
Nitrate + Nitrite as N	mg/L	1/Quarter	Grab	0.01
Total Kjeldahl Nitrogen	mg/L	1/Quarter	Grab	--
Total Nitrogen [3]	mg/L	1/Quarter	Calculated	--
Total Phosphorus as P	mg/L	1/Quarter	Grab	0.001
E. coli Bacteria	CFU/100mL	1/Quarter	Grab	1/100 mL
Total Organic Carbon (TOC)	mg/L	1/Quarter	Grab	--
Total Dissolved Solids (TDS)	mg/L	1/Quarter	Grab	10
Arsenic, dissolved [4]	mg/L	1/Quarter	Grab	0.001
Copper, dissolved [4]	mg/L	1/Quarter	Grab	0.001
Lead, dissolved [4]	mg/L	1/Quarter	Grab	0.0005

Footnotes:
1. See Definition section at end of permit for explanation of terms.
2. Calculated as the sum of Nitrate + Nitrite (as N) and Total Kjeldahl Nitrogen (as N) concentrations.
4. Sample filtration through a 0.045 µm membrane filter (DEQ-7, February 2006).

VII. Special Conditions

ARM 17.30.1342 (8) requires that the permittee furnish to the Department, within a reasonable time, any information to determine compliance with this permit. The following must be met within the given timeframe:

1. System Hydraulics – The 2006 PER identifies that the facultative lagoons lack detention time for adequate secondary treatment, the RI cells discharge more water to the ground water than to the Madison River (Outfall 001), and the storage cell leaks far more than Department design standards allow.

In 2008, the City reported to the Department that it had eliminated 50% of the I/I contribution to the collection system. According to self-monitoring data, effluent discharge rates have remained the same. Self-monitoring data for the POR reports a constant rate of 30 gpm or 43,000 gallons per day (gpd; Table 2). The design population is 2,390 and the design average discharge rate is 453,000 gpd (Table 1). Using the design values, the average contribution per capita is 190 gpd. The US Census reported that in 2000 the population of the town was 1,728. At the design

individual contribution of 190 gpd, an expected effluent discharge rate from Outfall 001 should be 328,000 gpd. The permittee has not provided an explanation for the discrepancy between reported and calculated expected discharge rates.

Effluent quality data summarized in Table 4 compares reported pollutant loads to nondegradation criteria. The reported discharge rates reflect the calculated "Actual 30-day Average Load" columns. For comparison, the BOD_5 and TSS nondegradation load rates, are calculated using the facility design rate, the reported loads could erroneously indicate that the facility has an order of magnitude remaining in its allocated load.

i) Authority: 75-5-402(3), MCA – a duty of the Department is to clearly identify the quality and volume of waste to be discharged. ARM 17.30.1342(10)(a) and Part II. A of the draft MPDES permit states that samples and measurements taken for the purposes of monitoring must be representative of the monitored activity.

ii) Schedule: Install and begin using continuous flow monitoring devices at the influent, splitter valve (Outfall PLT), and effluent (Outfall 001) locations by **September 1, 2009**. By **October 31, 2010**, complete a comprehensive water balance for the facility. The water balance must be submitted to the Department Water Protection Bureau by **November 14, 2010**.

2. Unauthorized Discharges – The permittee has not applied for ground water outfall(s). Documentation presented in this Statement of Basis show that the storage pond and RI cells are discharging wastewater to the local ground water. The storage pond was not designed to discharge treated wastewater to ground water (TDH, 1982; Great West Engineering, 2006). Recent MPDES compliance inspections have found extensive cattail coverage in the storage cell. Plant roots can destroy the effectiveness of a clay liner to contain wastewater. The RI dewatering pump system is not operated and/or maintained as designed; the pump system was installed to capture all treated infiltrated effluent and discharge it to the Madison River and to prevent a discharge to the ground water.

i) Authority: The Montana Water Quality Act at 75-5-605(2), MCA states that it is unlawful to use a disposal system that discharges to state water without a current permit from the Department. ARM 17.30.1322(1) states that anyone proposing or operating a discharge of pollutants shall submit a complete application. To date, the permittee has not requested a supplemental outfall to Outfall 001.

ii) Schedule: By **December 31, 2011**, the permittee must cease all discharges at unauthorized locations or obtain all necessary permits under the Montana Water Quality Act (75-5-101 *et seq.*, MCA).

3. Timeframe

Permit Condition	Timeframe
Install influent and effluent continuous read flow meters. Effluent flow must account for water discharged to the storage cell.	September 1, 2009
Complete a comprehensive water balance for the facility.	October 31, 2010
Report water balance to the Water Protection Bureau	November 14, 2010
Cease unauthorized discharge of pollutants to ground water or obtain appropriate permits under the Water Quality Act.	December 31, 2011

VIII. Other Information

On September 21, 2000, a U.S. District Judge issued an order stating that until all necessary total maximum daily loads (TMDLs) under Section 303(d) of the Clean Water Act are established for a particular water quality limited segment (WQLS), the State is not to issue any new permits or increases under the MPDES program. The order was issued in the lawsuit Friends of the Wild Swan v. U.S. EPA, et al. (CV 97-35-M-DWM), District of Montana and Missoula Division. The renewal of this permit does not conflict with Judge Molloy's order because this is not a new or increased discharge under MPDES.

IX. Information Source

Federal Regulations at 40 CFR, Parts 122, 133, 136.

Montana Statute, "Montana Water Quality Act", Title 75-5-101-605, Montana Code Annotated (MCA).

Administrative Rule of Montana (ARM) at:

- Subchapter 5: Mixing Zones in Surface and Ground Water. March 2006
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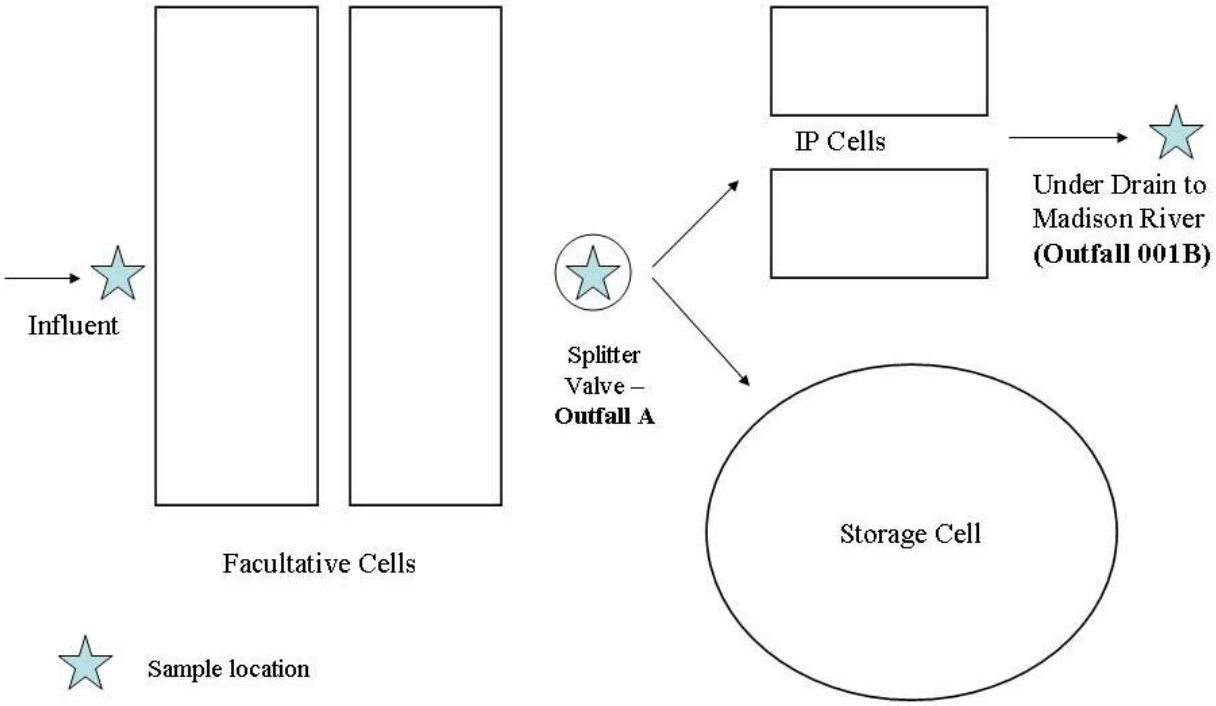

Figure 1: Facility flow-diagram.

Prepared by: Rebecca Ridenour
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